

Attachment 9

Economic Analysis – Water Quality and Other Expected Benefits

Rohner Creek Flood Control and Riparian Habitat Improvement Project

Water Quality Benefits

The proposed project has will reduce the erosion the banks of Rohner Creek experienced during high flow events. The channel widening and terracing combined with the habitat enhancement of the creek channel would not only stabilize the creek banks, but it would also provide areas in which sediment and silt could naturally deposit without being carried downstream and conveyed to Strongs Creek and eventually the Eel River, a 303(d) listed River for Sediment. Along with rock slope protection placed along the creek banks, large woody debris would be placed in strategic locations to provide habitat and stabilization to the channel.

While there are obvious water quality benefits to the proposed project, it is difficult to estimate the economic benefit. Thus, no dollars are presented in the benefits section of the economic analysis for water quality.

Seismic Hazard Reduction Benefits

An inspection of the three Rohner Creek bridges was completed by City staff, who found the condition of the bridges to be substandard and near the end of their functional life. The four bridges to be replaced by the project were all built between 1955 and 1960. All of the bridges were originally built by private citizens and thus it is unlikely that they were built to the standard code at the time. The City can find no record of these structures being permitted. In addition, even if they were built to code they were installed prior to the lateral force requirements added to the Uniform Building Code in 1975.

The proposed project is needed to ensure the bridges do not collapse during a seismic event . In the event of a bridge failure within the project reach, the failed bridge could cause a backwatering effect in the channel which could exacerbate the overbank flow into the adjacent neighborhoods. Upgrading these seismically unsafe and channel limiting structures now will ensure safe roadway passage and reduced potential for flooding for years to come.

The bridges are anticipated to fail during a magnitude 7.0 or greater event near the City of Fortuna. This earthquake has an annual probability of 0.11 of occurring based on USGS Earth quake probability maps for an exposure time of 50 years in the vicinity of the project site. During this event it is expected that all the trestle supports will fail, allowing the steel structure to fall into the Creek channel.

While modern seismic codes should make the bridge relatively safe from all earthquake events, earthquakes of magnitude 9.0 and greater are very difficult to design for with long shake times (sometimes 5 minutes or greater). Thus the project is only stating maintenance of the bridges up to a 9.0 magnitude event.

The additional flood damage resulting from failure of these bridges is difficult to predict. Thus, no dollar values are presented in the economic analysis.

Table 13 - Minimum Seismic Failure Economics Data

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Variables	Without Project	With Project
Earthquake magnitude which causes structural failure	7.0	9.0
Estimated probability of seismic event causing structural failure	0.11	0.09
Potential inundation damage	unknown	unknown